

## ATTACHMENT II

### Scope of Work for a RCRA Facility Investigation

#### Purpose

The purpose of the RCRA Facility Investigation (RFI) is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, areas of concern, and other source areas at and from the Facility and to gather all necessary data to support a Corrective Measures Study. U.S. Ceramic shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RFI.

#### Scope

The RCRA Facility Investigation is one step in the corrective action program. The RFI consists of the following components, which for clarity have been designated as sections.

#### Section I: Description of Current Conditions

- A. Facility Background
- B. Preliminary Assessment of Nature and Extent of Contamination
- C. Implementation of Interim/Stabilization Measures

#### Section II: RFI Workplan

- A. Purpose/Objectives
- B. Project Management Plan
- C. Quality Assurance Project Plan
- D. Data Management and Reporting Plan
- E. Health and Safety Plan
- F. Public Involvement Plan
- G. Schedule for Facility Investigation

#### Section III: Facility Investigation

- A. Purpose/Objectives

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- B. Environmental Setting
  - C. Source Characterization
  - D. Contamination Characterization
  - E. Potential Receptor Identification

#### Section IV: Investigation Results and Analysis

- A. Data Analysis
- B. Media Cleanup Standards
- C. Analysis of Risk

#### Section V: Progress Reports

#### Section VI: Proposed Schedule

## Section I: Description of Current Conditions

U.S. Ceramic shall submit to U.S. EPA for review and comment, a report (as set forth below) providing the background information on the Facility, contamination, and interim measures. U.S. Ceramic shall indicate in the applicable section if some of this information is not available. This report shall contain information that is consistent with the data gathered during the Preliminary Review/Visual Site Inspection performed on July 3, 1990, U.S. EPA's historical aerial photographic analysis performed on April 12, 1999, and the June 7, 1999 site visit investigating potential SWMU's identified in the photo analysis. The current condition report shall be submitted prior to submission of the RFI Workplan.

### A. Facility Background

U.S. Ceramic's report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage, or disposal of solid and hazardous waste. The report shall include:

1. *Maps.* All maps shall be of sufficient detail and accuracy to locate and report all current and future work performed at the site. Aerial photographs may be used with solid waste management units, areas of concern, and other source areas superimposed on them. (Note: An aerial photographic analysis of the Facility from 1934 through 1997 has been performed and will be used to provide additional background information on the Facility, including waste-related features and potential sources of contamination). Maps shall depict the following:

- General geographic location;
- Property lines, with the owners of all adjacent property clearly indicated;
- Topography and surface drainage depicting all waterways, wetlands, flood plains, water features, drainage patterns, and surface-water containment areas;
- All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

- All solid or hazardous waste treatment, storage, or disposal areas active after November 19, 1980;
  - All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on or after November 19, 1980;
  - All known past and present product and waste underground tanks or piping;
  - All known past and present electrical transformers containing PCB's;
  - Surrounding land uses (residential, commercial, industrial, agricultural, recreational);
  - The location of all municipal, public, private and industrial wells, along with all monitoring wells, at the Facility and within a 1-mile radius of the Facility. These wells shall be clearly labeled and ground and top of casing elevations and construction details included, if available (these elevations and details may be included as an attachment); and
  - Wind rose and meteorology.
2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility.
3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.
4. A summary of past permits applied for and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility. This may include information from previous and/or present owner/operators, if available.
5. A general description of major habitat types (e.g., grasslands, forests, lakes, streams, wetlands) located in and adjacent to the facility. In delineating wetlands, the

U.S. Fish and Wildlife Service's National Wetland Inventory maps should be consulted. The U.S. Army Corps of Engineers should be consulted and wetlands should be delineated using the Federal Manual for Identifying and Delineating Jurisdictional Wetlands.

6. A general description of plants and animals at and adjacent to the facility, including the following: qualitative observations of resident plants and animals (birds, mammals, fish, stream benthos, etc.); and classification of vegetation community types. Threatened and endangered species possibly on or near the facility should be identified as early as possible.

B. Preliminary Assessment of Nature and Extent of Contamination

U.S. Ceramic shall prepare and submit for U.S. EPA review, a preliminary report describing the existing information on the nature and extent of contamination.

1. The report shall summarize all possible source areas of contamination. This, at a minimum, shall include all RCRA-regulated units, solid waste management units, areas of concern, spill areas, and other suspected source areas of contamination. For each area, U.S. Ceramic shall identify the following:

- Location of unit/area (to be depicted on facility map provided in Section I.A.1);
- Quantities of solid and hazardous wastes (both managed and spilled or released);
- Type of hazardous waste or constituents (both causing or potentially causing contamination), to the extent known;
- Identification of areas where additional information is necessary; and
- The results of previous investigations.

2. U.S. Ceramic shall prepare a preliminary assessment and description of the existing degree and extent of contamination. This shall include:

- For each medium where the Order identifies a release (e.g., soil, groundwater, surface water,

sediments, etc.), a description of the existing extent of contamination. This description must include all available monitoring data and qualitative information on the locations and levels of contamination at the facility (both on-site and off-site). Include biodata (e.g., fishkills, distressed vegetation, abnormal individuals of a species, carcasses, tissue studies, etc.). Include a general assessment of the data quality, a map showing the location of all existing sampling points and potential source areas and contour maps showing any existing ground water plumes at the facility. Highlight potential ongoing release areas that would warrant use of interim measures (see Section I.C. Implementation of Interim/Stabilization Measures); and

- A list and brief description of all previous investigations that have occurred at the facility, who they were conducted for (i.e., agency) and agency contacts.

3. U.S. Ceramic shall submit a report that identifies the potential impact(s) on human health and the environment, including potential exposure pathways, migration routes, and potential receptors for all relevant land use scenarios related to the sources of contamination identified as relevant in paragraph 1 above. A site-conceptual model should be created to illustrate these pathways, routes, and receptors. The report shall include, at a minimum:

- All potential migration pathways, including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, foodwebs, meteorology, air quality, chemistry, fate and transport characteristics associated with affected media, and natural attenuation, as appropriate;
- Physical properties of known contaminants;
- An assessment of whether off-site migration of contaminants has occurred or is likely to occur;
- An assessment of media-specific potential human exposure pathways (e.g., ingestion, inhalation, dermal contact), including groundwater and surface water use;

- Identification of current and future land use;
- Identification of current or potential receptors at risk including demography and identification of possible sensitive subpopulations (e.g., schools, homes for the elderly, hospitals, and ecosystems).

#### C. Implementation of Interim/Stabilization Measures

The report shall document past, present, or proposed interim/stabilization measures at the facility. This shall include:

- Objectives of the interim/stabilization measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;
- Design, construction, operation, and maintenance requirements;
- Schedules for design, construction and monitoring;
- Schedule for progress reports;- and
- Data in support of the potential need for future interim measures or related to any assessment undertaken to determine the need for future interim/stabilization measures.

## Section II: RFI Workplan

### A. Purpose/Objectives

U.S. Ceramic shall prepare an RFI Workplan. The purpose of the RFI Workplan is to present to U.S. EPA the specific plans to characterize the nature and extent of contamination. The RFI Workplan shall include the development of several plans which will be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate facility-specific situations.

### B. Project Management Plan

U.S. Ceramic shall prepare a Project Management Plan (PMP) which will include a discussion of the technical approach, schedules, and personnel. The PMP will also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RFI.

### C. Quality Assurance Project Plan

U.S. Ceramic shall prepare a plan to document all monitoring procedures, sampling, field measurements and sample analysis performed during the investigations so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPP shall be prepared in accordance with Attachment V. A pre-QAPP meeting may be held prior to preparation of the QAPP. Participants should include, but are not limited to U.S. Ceramic, their QAPP preparer, laboratory representatives, EPA Project Coordinator, and EPA Quality Assurance representatives.

A performance audit may be conducted by U.S. EPA on the laboratories selected by U.S. Ceramic. This audit will be completed and laboratories approved for use on the project prior to the start of field work for the RFI.

### D. Data Management and Reporting Plan

U.S. Ceramic shall develop and initiate a Data Management and Reporting Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan



shall also provide the format to be used to present the raw data and conclusions of the investigation.

All groundwater data shall be submitted in a computer accessible format, i.e., diskette. The format used shall be compatible with the U.S. EPA, Region 5 groundwater database known as the Ground Water Information Tracking System (GRITS), Version 4.0.

#### E. Health and Safety Plan

U.S. Ceramic shall submit a Health and Safety Plan to U.S. EPA for review, although it does not require approval by U.S. EPA.

1. Major elements of the Health and Safety Plan may include:

- Facility description, including availability of resources such as roads, water supplies, electricity and telephone services;
- Description of the known hazards and evaluation of the risks associated with the incident and with each activity conducted;
- A list of key personnel and alternates responsible for site safety, response operations, and for protection of human health;
- Description of the levels of protection to be worn by personnel;
- Delineation of the work area;
- Procedures to control site access;
- Description of decontamination procedures for personnel and equipment;
- Site emergency procedures;
- Emergency medical care for injuries and toxicological problems;
- Description of requirements for an environmental surveillance program;
- Routine and special training required for response personnel; and

- Procedures for protecting workers from weather-related problems;

2. The Facility Health and Safety Plan shall be consistent with:

- NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
- U.S. EPA Order 1440.1 - Respiratory Protection;
- U.S. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
- Facility Contingency Plan;
- U.S. EPA Standard Operating Safety Guide (1984);
- OSHA regulations particularly in 29 CFR 1910 and 1926;
- State and local regulations; and
- Other U.S. EPA guidance as provided.

#### F. Public Involvement Plan

The Public Involvement Plan (PIP) prepared by U.S. Ceramic shall be submitted to U.S. EPA for comment and approval prior to use. U.S. Ceramic must never appear to represent or speak for the U.S. EPA before the public, other government officials, or the media.

Public involvement activities that may be required of U.S. Ceramic include the following:

- Conducting an open house or informal meeting (i.e., availability session) in a public location where people can talk to Agency officials and U.S. Ceramic on a one-to-one basis;
- Preparing fact sheets summarizing current or proposed corrective action activities (all fact sheets should be reviewed by the U.S. EPA prior to public distribution);
- Communicating effectively with people who have vested interest in the corrective action

activities, (e.g., providing written or verbal information in the foreign language of a predominantly non-English-speaking community); and

- Maintaining an easily accessible repository (such as a town hall or public library or the Facility itself, in some limited circumstances) of information on the facility-specific corrective action program, including the order, approved workplans, and/or other reports.

A schedule for community relations activities shall be included in the PIP.

#### G. Schedule for Facility Investigation

1. Sampling
2. Analysis
3. Reports
4. Public Involvement Activities
5. Laboratory or Bench-Scale Studies

### Section III: Facility Investigation

#### A. Purpose/Objectives

The Facility Investigation phase of the RFI is the first step of the implementation process. Prior to this implementation phase, all documentation and reports for the Description of Current Conditions and RFI Workplan are drafted and submitted to U.S. EPA for review. U.S. Ceramic must have approval prior to implementing the procedures outlined in the RFI Workplan. Throughout the RFI implementation phase, it is critical that U.S. Ceramic comply with report submission requirements. U.S. Ceramic shall submit both progress reports and a draft RFI Report to U.S. EPA for review. At the direction of U.S. EPA, U.S. Ceramic shall develop in final format the RFI Report, which will incorporate any comments received on the draft report.

U.S. Ceramic shall conduct those additional investigations (including sampling) as approved in the RFI Workplan to: characterize the facility (Environmental Setting); define the source (Source Characterization); define the degree and three dimensional extent of contamination (Contamination Characterization); and identify actual or potential receptors (Potential Receptors Identification).

The investigations shall result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative(s) during the CMS and/or IMs.

#### B. Environmental Setting

U.S. Ceramic shall collect information to supplement and verify existing information on the environmental setting at the facility (when information already submitted to U.S. EPA is not sufficient). The U.S. EPA may request additional information not included on the following lists. U.S. Ceramic shall characterize the following areas:

##### 1. Hydrogeology

U.S. Ceramic shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

- A description of the regional and facility-specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:

- Regional and facility-specific stratigraphy including: description of strata including strike and dip, and identification of stratigraphic contacts;
  - Structural geology including: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);
  - Depositional history;
  - Areas and amounts of recharge and discharge;
  - Influence of tidal actions on groundwater flow regimes near large rivers;
  - Regional and facility-specific groundwater flow patterns; and
  - Seasonal variations in the groundwater flow regime.
- An analysis of any topographic features that might influence the groundwater flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis.)
  - A representative and accurate classification and description of the hydrogeologic units based on field data, tests, and cores that may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated zones), including, but not limited to:
    - Hydraulic conductivity, intrinsic permeability [particularly when non-aqueous phase liquids (NAPLs) are present], and porosity (total and effective);
    - Lithology, grain size, sorting, degree of cementation;
    - An interpretation of hydraulic interconnections between saturated zones; and
    - The attenuation capacity and mechanisms of the natural earth materials (e.g., ion

exchange capacity, organic carbon content, mineral content, etc.).

- Based on field studies and cores, structural geology and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units that may be part of the migration pathways identifying:
  - Sand and gravel in unconsolidated deposits;
  - Zones of fracturing or channeling in consolidated and unconsolidated deposits;
  - Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;
  - The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs;
  - Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration, including perched zones of saturation; and
  - All other geologic formations, or parts thereof, yielding a significant amount of groundwater.
- Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:
  - Water level contour and/or potentiometric maps;
  - Hydrologic cross sections showing vertical flow gradients;
  - The flow system, including the vertical and horizontal components of flow; and

- Any temporal changes in hydraulic gradients, (due to tidal or seasonal influences, etc.)
- A description of man-made influences that may affect the hydrogeology of the site, identifying:
  - Active and inactive local water-supply and production wells with an approximate schedule of pumping; and
  - Man-made hydraulic structures (sewers, pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

## 2. Soils

U.S. Ceramic shall conduct a program to characterize the soil and rock units potentially affected by contaminant release(s). Such characterization shall include, but not be limited to, the following information:

- Where remediation by removal of soils is the only corrective measure option, provide map(s) and perpendicular cross sections showing:
  - The extent of contamination;
  - Depth of groundwater; and
  - The consistency and distribution of soils [using the Unified Soil Classification System (ASTM D 2487)];
- Where remediation by removal is the likely option, and it is necessary to determine the extent of migration (e.g., to assess the mobility of wastes from an unlined surface impoundment or landfill), provide the following in addition to the requirements immediately above:
  - Depth to bedrock and the characteristics of the bedrock including discontinuities such as faults, fissures, joints, fractures, sinkholes, etc.;

- A detailed soil survey conducted according to USDA Soil Conservation Service (SCS) procedures including:

- USDA Textural Soil Classification and soil profiles showing stratifications or zones which may affect or direct the subsurface flow;
- Hydraulic conductivity and the SCS hydrologic group classification of A, B, C or D;
- Relative permeability (only if the waste may have changed the soil's hydraulic conductivity, such as concentrated organics);
- Storage capacity (if excavated soil will be stored);
- Shrink-swell potential (where extreme dry weather could lead to the formation of cracks);
- Potential for contaminant transport via erosion, using the Universal Soil Loss Equation;
- Soil sorptive capacity;
- Cation exchange capacity;
- Soil organic content; and
- Soil pH.

- The following contaminant characteristics must be included:

- Physical state;
- Viscosity;
- pH;
- pKa;



- Density;
- Water solubility;
- Henry's Law Constant;
- $K_{ow}$ ;
- Biodegradability; and
- Rates of hydrolysis, photolysis and oxidation.

- Where in-situ soil treatment will likely be the remediation, the above information and the following additional information must be provided:

- Bulk density;
- Porosity;
- Grain size distribution;
- Mineral content;
- Soil moisture profile;
- Unsaturated hydraulic conductivity;
- Effect of stratification on unsaturated flow; and
- Infiltration and evapotranspiration.

### 3. Surface Water and Sediment

U.S. Ceramic shall conduct a program to characterize the surface water bodies likely to be affected by releases from the facility (e.g., Nimishillen Creek and its on-site tributaries). Such characterization shall include the following activities and information:

- Description of the temporal and permanent surface water bodies including:
  - For lakes: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

- For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;
- For rivers, streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100-year event);
- For wetlands obtain any available delineation;
- Containment measures in place (e.g., levees, concrete lining, etc.)
- Drainage patterns; and
- Evapotranspiration rates.
- Description of the chemistry of the natural surface water and sediments. This includes determining:
  - pH;
  - total dissolved solids;
  - total suspended solids;
  - biological oxygen demand;
  - alkalinity;
  - conductivity;
  - dissolved oxygen profiles;
  - nutrients ( $\text{NH}_3$ ,  $\text{NO}_3$  /  $\text{NO}_2$ ,  $\text{PO}_4^{3-}$ );
  - chemical oxygen demand;
  - total organic carbon; and
  - concentrations of the site-specific contaminants of concern.
- Description of sediment characteristics including:
  - Deposition area;

- Thickness profile; and
- Physical parameters (e.g., grain size, density, ion exchange capacity, etc.).

### C. Source Characterization

U.S. Ceramic shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition (containment or nature of disposal); and any facility characteristics that may affect or have affected a release (e.g., facility security, engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

#### 1. Unit/Disposal Area/Area of Concern Characteristics:

- Location of unit/disposal area;
- Type of unit/disposal area;
- Design features;
- Operating practices (past and present) including the history of releases;
- Period of operation;
- Age of unit/disposal area;
- General physical conditions; and
- Method used to close or remediate the unit/disposal area.

#### 2. Waste Characteristics:

- Type of waste placed in the unit;
  - Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);
  - Quantity; and
  - Chemical composition.

- Physical and chemical characteristics;
  - Physical form (solid, liquid, gas);
  - Physical description (e.g., powder, oily sludge);
  - Temperature;
  - pH;
  - General chemical class (e.g., acid, base, solvent);
  - Molecular weight;
  - Density;
  - Boiling point;
  - Viscosity;
  - Solubility in water;
  - Cohesiveness of the waste;
  - Vapor pressure; and
  - Flash point.
- Migration and dispersal characteristics of the waste;
  - Sorption;
  - Biodegradability, bioconcentration, biotransformation;
  - Photodegradation rates;
  - Hydrolysis rates; and
  - Expected chemical transformations.

U.S. Ceramic shall document the procedures used in making the above determinations.

#### D. Contamination Characterization

U.S. Ceramic shall collect analytical data on environmental media, including ground water, soils, surface water, and sediment likely to be affected by releases from the Facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include:

- time and location of sampling;
- media sampled;
- concentrations found;
- conditions during sampling; and
- the identity of the individuals performing the sampling and analysis.

U.S. Ceramic shall address the following types of contamination at the facility:

##### 1. Groundwater Contamination

U.S. Ceramic shall conduct a groundwater investigation to characterize any plumes of contamination at the facility. This investigation shall, provide the following information:

- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;
- The horizontal and vertical direction of contaminant movement;
- The velocity of contaminant movement;
- The horizontal and vertical concentration profiles of Appendix IX constituents in the plume(s) [sampling under the RFI Workplan need not include all Appendix IX hazardous constituents and can be limited to those hazardous constituents known to be associated with operations at the Facility];
- An evaluation of factors influencing the plume movement; and

- An extrapolation of future contaminant movement.

U.S. Ceramic shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

## 2. Soil Contamination

U.S. Ceramic shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

- A description of the vertical and horizontal extent of contamination;
- A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;
- Site-specific contaminant concentrations;
- Velocity and direction of contaminant movement; and
- An extrapolation of future contaminant movement.

U.S. Ceramic shall document the procedures used in making the above determinations.

## 3. Surface Water and Sediment Contamination

U.S. Ceramic shall conduct a surface water and sediment investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. U.S. Ceramic is also required to characterize contamination from storm water runoff. The investigation shall include the following information:

- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility, and the extent of contamination in underlying sediments;

- The horizontal and vertical direction of contaminant movement;
- The contaminant velocity;
- An evaluation of the physical, biological, and chemical factors influencing contaminant movement;
- An extrapolation of future contaminant movement; and
- A description of the chemical and physical properties of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

U.S. Ceramic shall document the procedures used in making the above determinations.

#### E. Potential Receptor Identification

U.S. Ceramic shall collect data describing the human populations and environmental systems that currently or potentially are at risk of contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be required by U.S. EPA. The following characteristics shall be identified:

##### 1. Local uses and possible future uses of groundwater:

- Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, public and industrial) and
- Location of groundwater users including wells and discharge areas.

##### 2. Local uses and possible future uses of surface waters characterized in the "Environmental Setting" or "Contamination Characterization" Sections above:

- Domestic and municipal (e.g., potable and lawn/gardening watering);
- Recreational (e.g., swimming, fishing);

- Agricultural;
- Industrial; and
- Environmental (e.g., fish and wildlife propagation).

3. Authorized or unauthorized human use of or access to the facility and adjacent lands, including but not limited to:

- Recreation;
- Hunting;
- Residential;
- Commercial;
- Zoning; and
- Relationship between population locations and prevailing wind direction.

4. A demographic profile of the people who use or have access (authorized or unauthorized) to the facility and adjacent land, including, but not limited to: age; sex; sensitive subgroups; and environmental justice concerns.

5. A description of the ecological characteristics of the facility and adjacent areas, including habitat and species present and expected to be present. Data required for this may include the following:

- Chemical sampling in potentially exposed habitats and reference sites.
- Toxicity testing.
- Tissue analyses.
- Biological community assessment.
- Habitat assessment of aquatic and terrestrial habitats on or potentially affected by the facility.
- Revised assessment of ecological impacts on receptors. Impacts should include those occurring



at individual level (e.g., mortality, growth and reproductive impairments) and those occurring at higher levels of biological organization (i.e., at population, community, and ecosystem levels).

6. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

7. A description of any State and Federal endangered or threatened species (both proposed and listed) near the Facility.

#### Section IV: Investigation Results and Analysis

U.S. Ceramic shall prepare an analysis and summary of all facility investigations and their results. The investigation data should be sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study and/or IMs.

##### A. Data Analysis

U.S. Ceramic shall analyze all facility investigation data outlined in Section III and prepare a report on the type and extent of contamination at the facility which has not been eliminated from further investigation by the screening methods used, including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area as well as in relation to applicable screening levels.

##### B. Media Cleanup Standards

U.S. Ceramic shall provide information as required to support U.S. EPA's selection/development for media cleanup standards (MCSs) of any releases that may have adverse effects on human health and the environment due to migration of waste constituents. MCSs are to contain such terms and provisions as necessary to protect human health and the environment, including, the provisions stated below.

###### 1. Groundwater Cleanup Standards

U.S. Ceramic shall provide information to support U.S. EPA's selection/development of groundwater cleanup standards for all of the Appendix IX constituents found in the groundwater during the Facility Investigation (Section III). The groundwater cleanup standards shall consist of:

- For any constituents for which an MCL has been promulgated under the Safe Drinking Water Act, the MCL value;
- Background concentration of the constituent in the ground water; or

- 
- An alternate standard [e.g., an alternate concentration limit (ACL) for a regulated unit] to be approved by U.S. EPA.

## 2. Soil Cleanup Standards

U.S. Ceramic shall provide information to support U.S. EPA's selection/development of soil cleanup standards. U.S. EPA may require the following information:

- The volume and physical and chemical characteristics of the wastes in the unit;
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- The patterns of precipitation in the region;
- The existing quality of surface soils, including other sources of contamination and their cumulative impacts on surface soils;
- The potential for contaminant migration and impact to the underlying groundwater;
- The patterns of land use in the region;
- The potential for health risks caused by human exposure to waste constituents; and
- The potential for damage to domestic animals, wildlife, food chains, crops, vegetation, and physical structures caused by exposure to waste constituents.

## 3. Surface Water and Sediment Cleanup Standards

U.S. Ceramic shall provide information to support U.S. EPA's selection/development of surface water and sediment cleanup standards. U.S. EPA may require the following information:

- The volume and physical and chemical characteristics of the wastes in the unit;
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- The patterns of precipitation in the region;
- The quantity, quality, and direction of groundwater flow;
- The proximity of the unit to surface waters;
- The current and potential uses of nearby surface waters and any water quality standards established for those surface waters;
- The existing quality of surface waters, including other sources of contamination and their cumulative impacts on surface waters;
- The potential for damage to domestic animals, wildlife, food chains, crops, vegetation and physical structures caused by exposure to waste constituents;
- The patterns of land use in the region; and
- The potential for health risks caused by human exposure to waste constituents.

#### 4. Other Relevant Cleanup Standards

U.S. Ceramic shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., Ohio Water Quality Standards, water quality criteria, health advisories, proposed MCL's, etc.).

#### C. Analysis of Risk

U.S. Ceramic may determine as necessary an analysis of risk at the facility. This analysis would include ecological as well as human health risk and shall be consistent with applicable

guidance provided in Attachment VI. Risk may be evaluated at several milestones within the process, as developed in the U.S. EPA-approved RFI Workplan. The RFI will be designed to develop data that will support future risk-based remedial decisions and to enable the assessment of any risk posed by identified releases of hazardous waste from the Facility as a whole or from significant portions of the Facility.

All activities in conducting corrective action pursuant to this Order will allow for risk screening steps to be conducted with the data available at the risk assessment phase as well as within the RFI and CMS as appropriate. Generally, a screening risk assessment would be conducted during the RFI with additional, more detailed analysis, including appropriate cumulative risk, occurring as more data becomes available. The highest level of risk analysis may occur later in the CMS stage.

## Section V: Progress Reports

U.S. Ceramic will, at a minimum, provide the U.S. EPA with signed monthly progress reports. These reports are required to contain the following information, but U.S. EPA requirements are not limited to this list:

1. A description and estimate of the percentage of the RFI completed;
2. Summaries of all findings in the reporting period, including results of any sampling and analysis;
3. Summaries of all changes made in the RFI during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all contacts made regarding access to off-site property;
6. Summaries of all problems encountered during the reporting period;
7. Actions being taken to rectify problems;
8. Changes in relevant personnel during the reporting period;
9. Projected work for the next reporting period; and
10. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

Section VI: Proposed Schedule

U.S. Ceramic will provide U.S. EPA with RFI submittals according to the following schedule:

Facility Submission	Due Date
Description of Current Conditions (Section I)	120 days after the effective date of the Decree
RFI Workplan (Section II)	90 days after receipt of U.S. EPA's comments on the DOCC
Draft RFI Report (Sections III and IV)	As scheduled in the approved RFI Workplan
Final RFI Report	45 days after receipt of comments on the Draft RFI Report
Progress Reports on Sections I through IV	Monthly